ASSIGNMENT 1 REPORT
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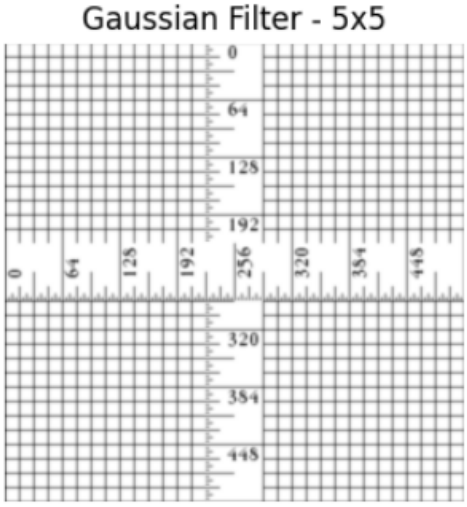
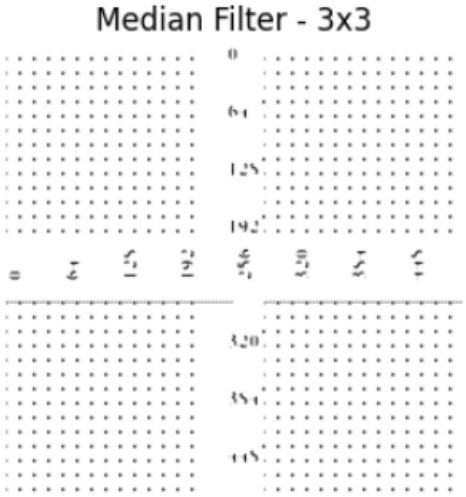
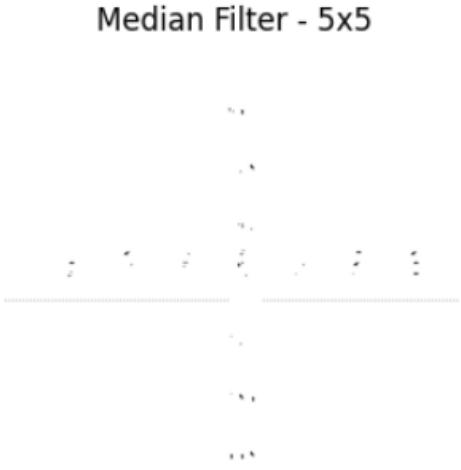
Ques 1)







For the given image, gaussian filter preserves the edge better as gaussian filter does not entirely remove the edges but simply reduces them while the median filter drastically alters pixel values to the median of their neighborhood which changes edge pixels as those edge values do not lie close to the median of their neighborhood.
For images with prominent edges against smoother backgrounds, gaussian filter can reduce background noise while the edges remain prominent whereas median filter treats edge pixels and noise similarly, therefore degrading the edge.

Ques 2)

First order derivative filters used for sharpening are -

1. Roberts Cross - It computes the approximate gradient of an image intensity function, using a 2x2 convolution kernel.
2. Sobel - It uses a 3x3 convolution kernel to compute the gradient magnitude. It emphasizes edges where there are jumps in intensity.
3. Prewitt - It is used for detecting vertical and horizontal edges in images. It also uses a 3x3 convolution kernel to achieve this.

Second order derivative filters used -

1. Laplacian - It is an isotropic measure of the second spatial derivative of an image. It calculates the difference between a pixel's value and the average of its neighbors. If the value is positive, it implies that the pixel is in a region of the image that's surrounded by darker pixels. If negative, it's in a brighter region. Near zero values indicate flat regions. The zero-crossings of the Laplacian filter response can indicate edges.
2. Laplacian of Gaussian (LoG) - LoG represents the second derivative of the Gaussian and can be used as an edge detector. The operation involves first smoothing an image with a Gaussian filter, then computing the Laplacian of the smoothed image.
3. Difference of Gaussians (DoG) - DoG is an approximation of LoG. It's computed by taking the difference between two Gaussian-blurred images with different sigma.

Roberts Filter - 2x2

Laplacian Filter - 3x3

Sobel Filter - 3x3

LoG Filter - 5x5

Prewitt Filter - 3x3

DoG Filter - 5x5